

Claims

1. Device for the variable actuation of the gas-exchange valves of internal combustion engines, for which one or more cams (2) of a camshaft (1), mounted in a housing, rotate independently of the rpm of the engine, the cam (2) initially driving an intermediate link (4), which carries out an oscillating, strictly rotational movement, the axis of rotation of which (7) in the housing can be shifted parallel to itself along an adjusting cam (8), which has a control cam (5) with a pause region (5a) and a lifting region (5b), and, over this control cam, actuates a power take-off element (11), which, in turn, actuates at least one valve, characterized in that the intermediate link (4) is mounted on a bolt (6) with an axis corresponding to the axis of rotation (7) and the bolt (6) is mounted parallel displaceably on the adjusting cam, the parallel displacement being brought about by means of cam discs (18) and tappets (18a) or sliding blocks (21), which are supported directly or indirectly against the housing.

2. The device of claim 1, characterized in that the cam discs (18) are disposed rotatably at the housing on an adjusting shaft 17 and the adjusting movement, produced by the cam disk (18) is transferred over a tappet (18a) onto the bolt (6)

3. The device of claim 1, characterized in that the bolt (6) is mounted rotationally movably in its guides and carries one or more cam discs (18), which are supported with their cams directly or indirectly at the housing, and the bolt can be twisted over a suitable connecting element by an adjusting agent.

4. A device of one or more of the claims 1 to 3, characterized in that the cam discs (18) support the bolt (6) essentially in the tangential direction with respect to the adjusting cam (8).

5. The device of claim 3, characterized in that sliding blocks (21) of a material of greater hardness, against which the cam discs (18) are supported, are disposed in the housing.

6. The device of claims 1 to 5, characterized in that a hydraulic clearance equalizing element is provided at the power take-off element.

7. The device of claims 1 to 6, characterized by a separate arrangement for each engine valve.

8. The device of claims 1 to 6, characterized by its separate arrangement of all intake or exhaust valves of a cylinder head.

9. The device of claims 1 to 6, characterized by its separate arrangement for all valves of a cylinder head.

10. The device of claims 1 to 6, characterized by its separate arrangement for, in each case, two adjacent, parallel valves of a cylinder.

11. The device of claim 10, characterized by the common, combined actuation of the intake and/or exhaust valves of a cylinder.

12. The device of claim 11, characterized by a common intermediate link with two identical control cams for the two valves.

13. The device of claim 11, characterized by a common intermediate link with two different controls cams for the two valves.

14. The device of claim 10, characterized by two identical cams (2) and by two intermediate links (4) with identical control cams for the two valves.

15. The device of claim 10, characterized by two different cams (2) and two intermediate links (4) with different control cams for the two valves.

16. The device of claim 10, characterized by two different cams (2) and two intermediate links (4) with identical control cams for the two valves.

17. The device of claims 1 to 16, characterized by an adjustment for keeping at least one valve closed constantly.

18. The device of claims 1 to 17, characterized by a hydraulic unit, which specifies the respective, requested angular position to the bolt (6) directly or indirectly.

19. The device of claims one to 17, characterized by an electric adjusting motor (23), which specifies the requested angular position in each case directly or indirectly to the bolt (6) over a gear mechanism.

20. The device of the various claims of claims 1 to 7 as well as 10 to 19, characterized by an adjusting strategy in such a manner that the valve lifts of the individual cylinders are adjusted constantly as a function of the signal of the angle of rotation transmitter (42) of the crankshaft or the evaluation of the signal.

21. The device of various claims of the claims 1 to 7 as well as 10 to 20, characterized by an adjusting strategy in such a manner that the adjusting movements take place essentially during the joint pause phase of all valves operated jointly by an adjusting motor (23).